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(71) Applicant(s)

Schlumberger Holdings Limited  
(Incorporated in the British Virgin Islands)  
PO Box 71, Craigmuir Chambers, Road Town, Tortola,  
British Virgin Islands

(72) Inventor(s)

Johan Olof Anders Robertsson  
Julian Edward Kragh  
James Edward Martin

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(56) Documents Cited by ISA

GB 2333364 A GB 2090407 A US 5850622 A  
US 4979150 A US 4486865 A US 4222266 A  
US 3747055 A US 2757356 A

FJ Barr et al, Annual Meeting of Society Expl.  
Geophys. Expanded Abstracts, January 1989, pp  
653-656

Geophysics, Vol 60 No 1, January 1995, pages 212-222  
Geophysics, Vol 29 No 5, October 1964, pages 783-805

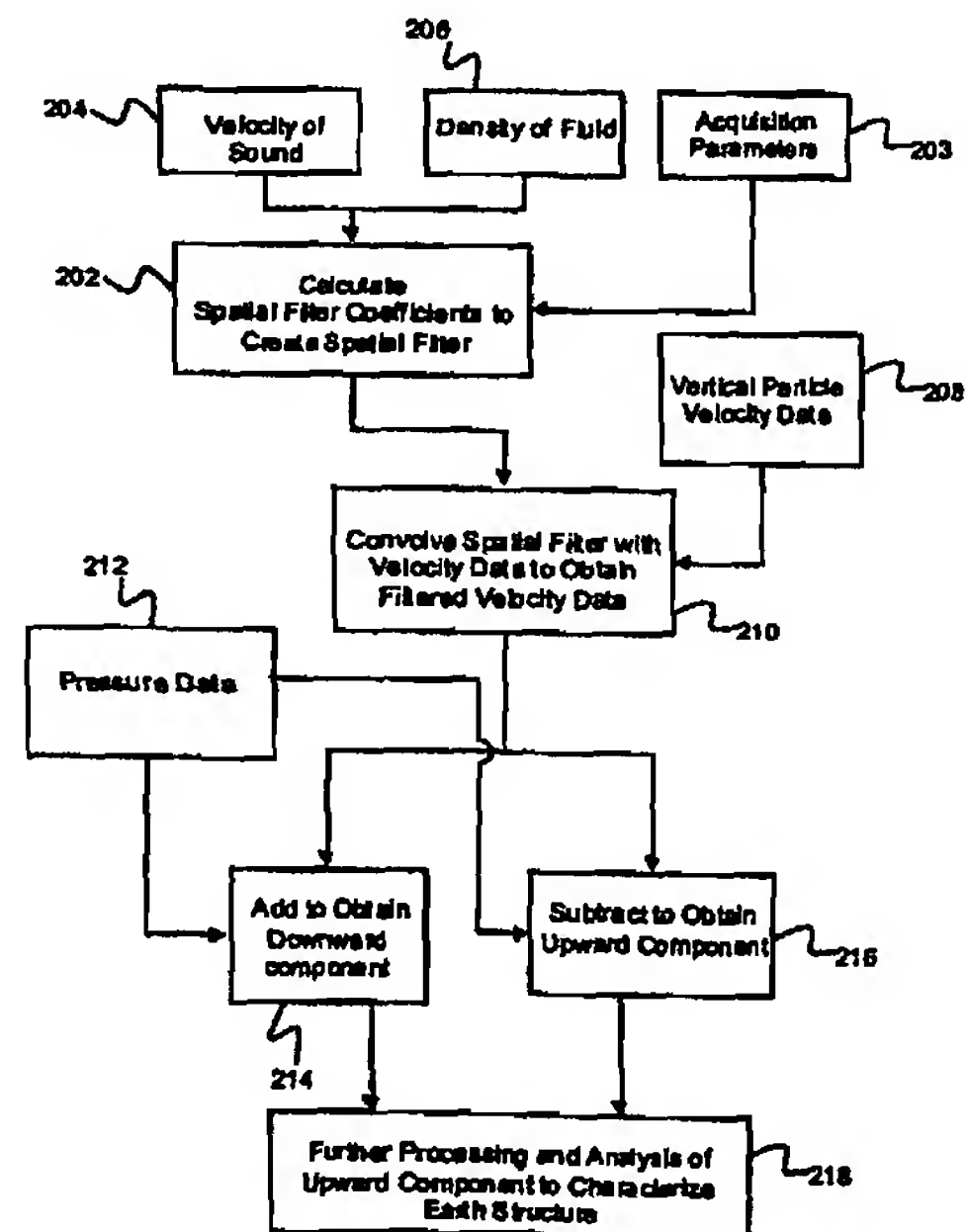
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(54) Abstract Title

**Method and system for reducing effects of sea surface ghost contamination in seismic data**

(57) An improved de-ghosting method and system that utilises multi-component marine seismic data recorded in a fluid medium is disclosed. The disclosed method makes use of two types of data: pressure data, that represents the pressure in the fluid medium, such as sea water, at a number of locations; and vertical particle motion data, that represents the vertical particle motion of the acoustic energy propagating in the fluid medium at a number of locations within the same spatial area as the pressure data. The vertical particle motion data can be in various forms, for example, velocity, pressure gradient, displacement, or acceleration. A spatial filter is designed so as to be effective at separating up and down propagating acoustic energy over substantially the entire range of non-horizontal incidence angles in the fluid medium. The spatial filter is applied to either the vertical particle motion data or to the pressure data, and then combined with the other data to generate pressure data that has its up and down propagating components separated.



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(74) Agent and/or Address for Service  
**Schlumberger Cambridge Research Limited**  
**Intellectual Property Law Department, High Cross,**  
**Maddingley Road, CAMBRIDGE, CB3 0EL, United Kingdom**